



Christ Church  
Grammar School

2021  
Test 2

## MATHEMATICS METHODS Year 11

### Section One: Calculator-free

Your name \_\_\_\_\_

Teacher's name \_\_\_\_\_

#### Time and marks available for this section

Working time for this section: 30 minutes

Marks available: 30 marks

#### Materials required/recommended for this section

##### *To be provided by the supervisor*

This Question/Answer Booklet

Formula sheet

##### *To be provided by the candidate*

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: nil

#### Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

**Instructions to candidates**

1. The rules of conduct of the CCGS assessments are detailed in the Reporting and Assessment Policy. Sitting this assessment implies that you agree to abide by these rules.
2. Write your answers in this Question/Answer Booklet using a blue/black pen. Do not use erasable or gel pens.
3. Answer all questions.
4. You must be careful to confine your response to the specific question asked and to follow any instructions that are specified to a particular question.
5. Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.
6. **Show all your working clearly.** Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than one mark, valid working or justification is required to receive full marks. If you repeat an answer to any question, ensure that you cancel the answer you do not wish to have marked.
7. It is recommended that **you do not use pencil**, except in diagrams.

**Question 1****(8 marks)**

Solve the following equations.

(a)  $8x^2 = 16x$

(2 marks)

(b)  $\frac{2(2-3x)}{5} + \frac{2x-1}{3} + 1 = 2$

(3 marks)

(c)  $\frac{16}{x} = x + 6$

(3 marks)

**Question 2****(5 marks)**

Given that  $f(x) = 6 - 5x$  and  $g(x) = 6x^2 + 7x$ , find:

(a)  $f(-1) + g(-1)$

**(2 marks)**

(b)  $x$ , when  $g(x) = 10$

**(3 marks)**

**Question 3****(5 marks)**

- (a) For what value/s of  $a$  is the point  $(a, 3)$  13 units away from the point  $(7, 8)$ .  
(3 marks)

- (b) The point  $M(8, 1)$  is the midpoint of  $A$  and  $B(20, 7)$ . Determine the coordinates of  $A$ .  
(2 marks)

**Question 4****(9 marks)**

- (a) A straight line passes through points  $C(2, -5)$  and  $D(-2, 2)$ . Determine the equation of the straight line that is perpendicular to this line and passes through  $C$ , expressing your answer in the form  $ax + by + c = 0$ , where  $a$ ,  $b$ , and  $c$  are integers. (4 marks)

**Question 4 continued**

(b) For the graph with the equation  $y = (x + 2)(x - 4)$ , determine the coordinates of

(i) all intercepts. (3 marks)

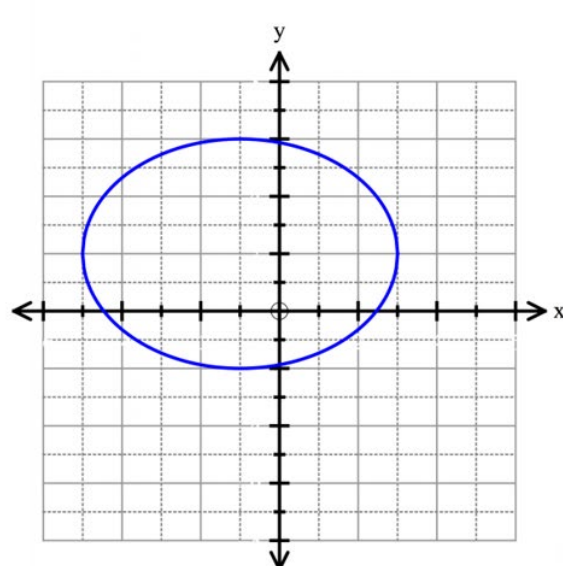
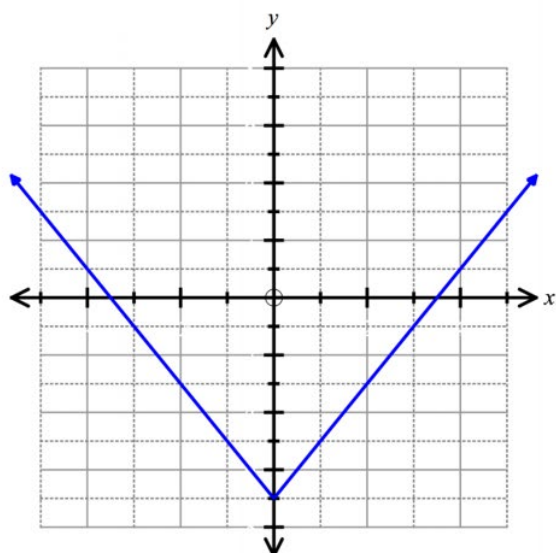
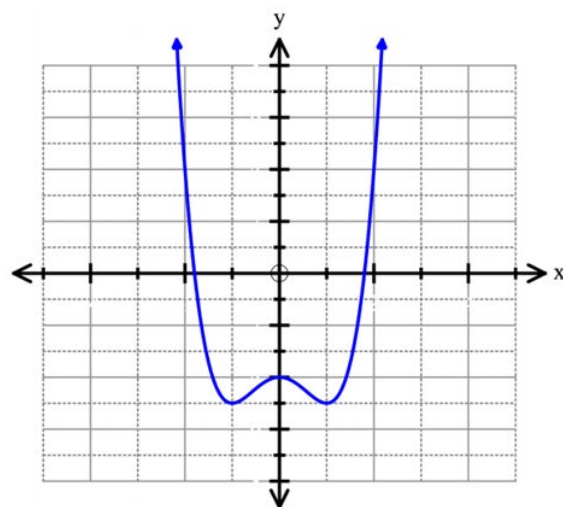
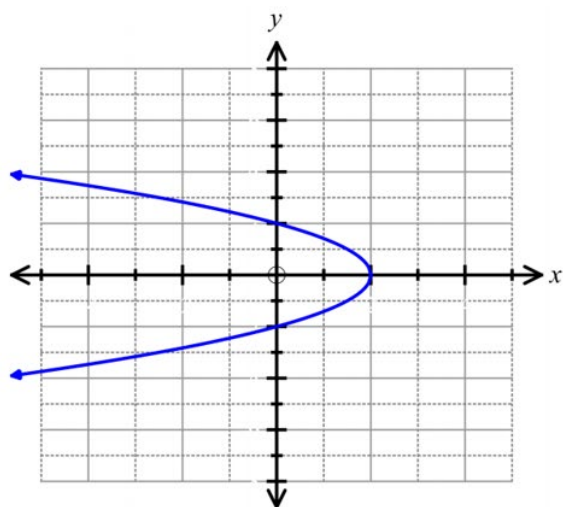
(ii) the turning point. (2 marks)

**Question 5**

**(3 marks)**

(a) Circle the graph/s that represent a function.

**(2 marks)**



(b) Explain why the graph/s selected in part (a) represent a function.

**(1 mark)**





## MATHEMATICS METHODS Year 11

### Section Two:

### Calculator-assumed

Your name \_\_\_\_\_

Teacher's name \_\_\_\_\_

### Time and marks available for this section

Working time for this section: 15 minutes

Marks available: 14 marks

### Materials required/recommended for this section

#### *To be provided by the supervisor*

This Question/Answer Booklet

Formula Sheet (retained from Section One)

#### *To be provided by the candidate*

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: drawing instruments, templates, and up to three calculators approved for use in this assessment

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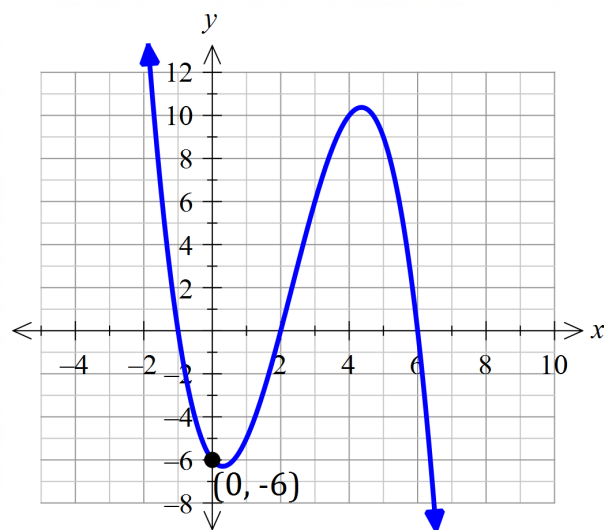
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**Question 6**

**(6 marks)**

The graph of  $y = ax^3 + bx^2 + cx + d$  is shown below. Determine the values of the constants  $a$ ,  $b$ ,  $c$ , and  $d$ .



**Question 7**

**(3 marks)**

State the natural domain and range for the function  $y = 5 - x^2$

**Question 8****(5 marks)**

The water level under the Narrows Bridge approximately follows the formula

$h = \frac{20t - 2t^2}{5}$  where  $h$  is the vertical height of water (in metres) and  $t$  is the number of hours after 9 am.

(a) At what time is the water level at its highest? (1 mark)

(b) Determine the height of the water level at this time. (1 mark)

(c) Ferries can only pass under the bridge when the water level is 2.5 metres or more below the maximum height. Determine during which times of the day a ferry can pass under the bridge. (3 marks)

**End of questions**